US006020889A

United States Patent [19]

Tarbox et al.

[11] Patent Number: 6,020,889

[45] Date of Patent: Feb. 1, 2000

[54] **SYSTEM FOR DISPLAYING A COMPUTER MANAGED NETWORK LAYOUT WITH VARYING TRANSIENCE DISPLAY OF USER SELECTED ATTRIBUTES OF A PLURALITY OF DISPLAYED NETWORK OBJECTS**

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[73] Assignee: **International Business Machines Corporation**, Armonk, N.Y.

[21] Appl. No.: **08/971,252**

[22] Filed: **Nov. 17, 1997**

[51] **Int. Cl.**[7] **G06F 3/14**; G06F 11/32

[52] **U.S. Cl.** **345/356**; 345/334; 345/347; 345/339; 345/969; 709/223

[58] **Field of Search** 345/349, 969, 345/348, 356, 970, 347, 339, 145, 333, 334; 395/200.53, 200.54

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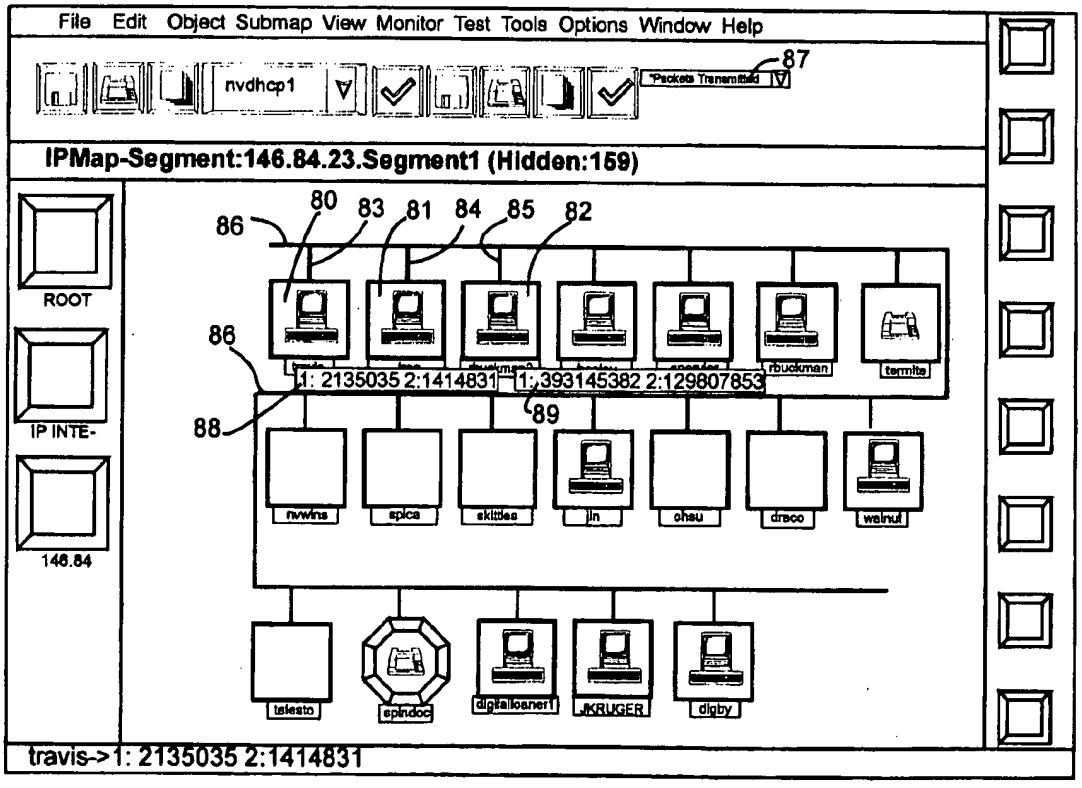
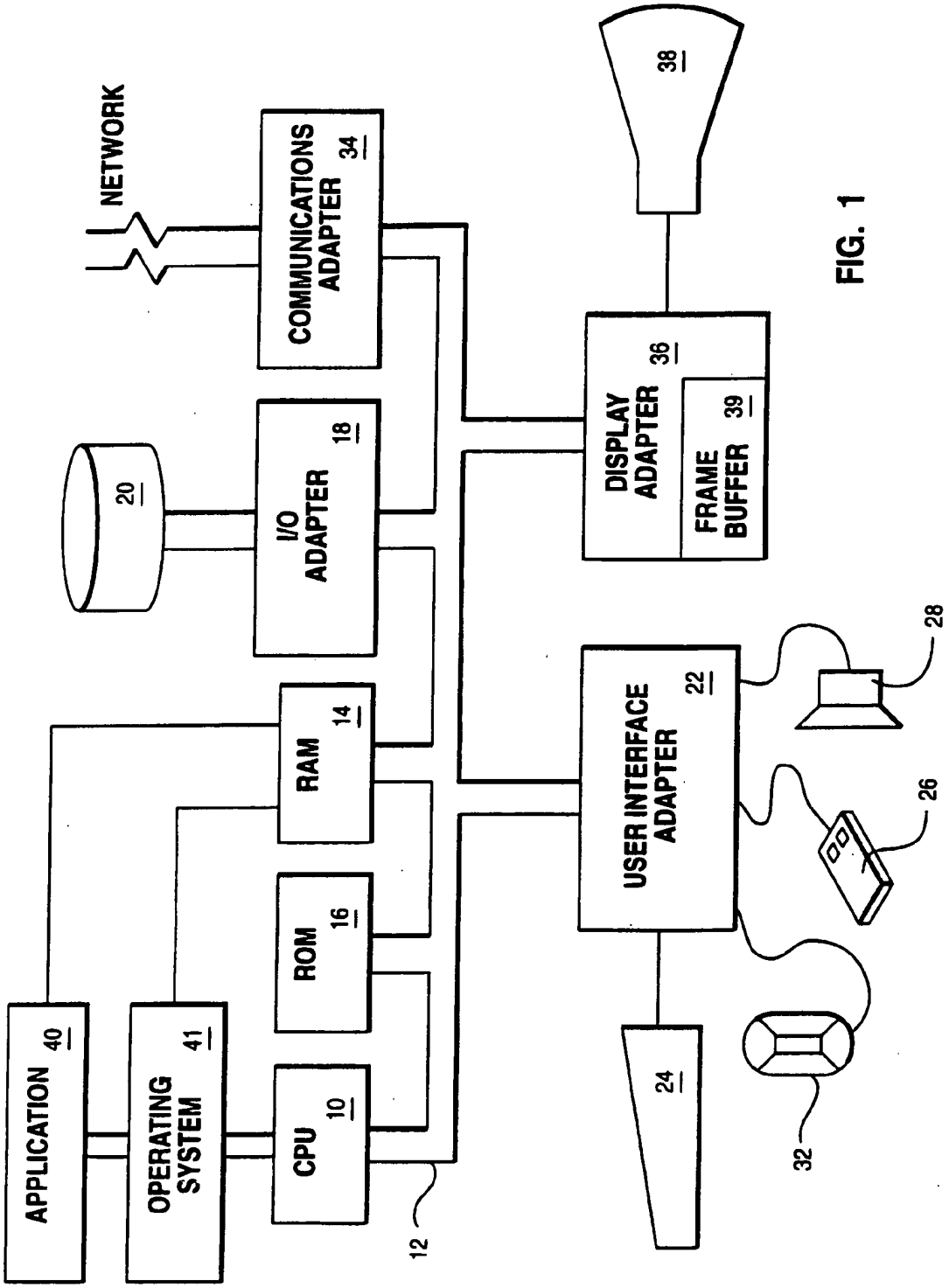
Primary Examiner—Raymond J. Bayerl
Assistant Examiner—Cuong T. Thai
Attorney, Agent, or Firm—Jeffrey S. LaBaw; Jerry Kratt

[57] **ABSTRACT**

A computer managed communication network with user interactive access via a plurality of display terminals and including a plurality of network objects, each respectfully associated with one of a plurality of linked network nodes. The network includes means such as databases for storing data representing attributes of network objects. There is graphically displayed on at least one of said display terminals, at least a portion of said linked network nodes and associated objects. In addition, there is a user interactive implementation for activating for each of a plurality of objects, a transient display of a selected attribute of said object proximate to said object during a period of common transience. The system further includes user interactive means for varying the period of transience of each of said transient displays whereby the attribute values of a variety of objects may be compared to each other without unduly cluttering the display interface.

24 Claims, 8 Drawing Sheets

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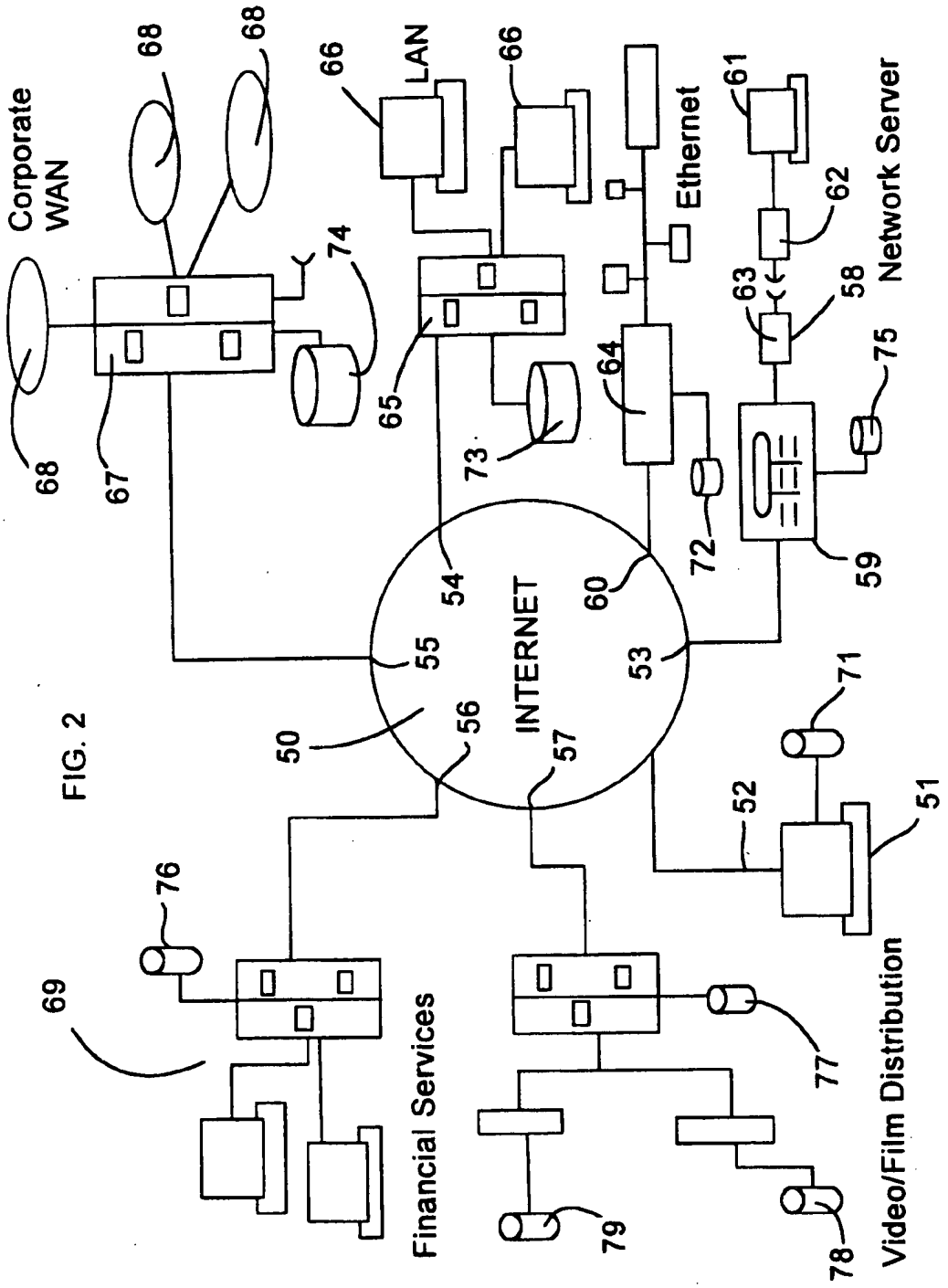
38
DISPLAY ADAPTER 36
FRAME BUFFER 39
20
I/O ADAPTER 18
RAM 14
ROM 16
CPU 10
APPLICATION 40
OPERATING SYSTEM 41
12
USER INTERFACE ADAPTER 22
28
26
24
32

FIG. 1


Corporate WAN
LAN
Ethernet
Network Server
INTERNET
Financial Services
Video/Film Distribution
50
51
52
53
54
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56
57
58
59
60
61
62
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66
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FIG. 2

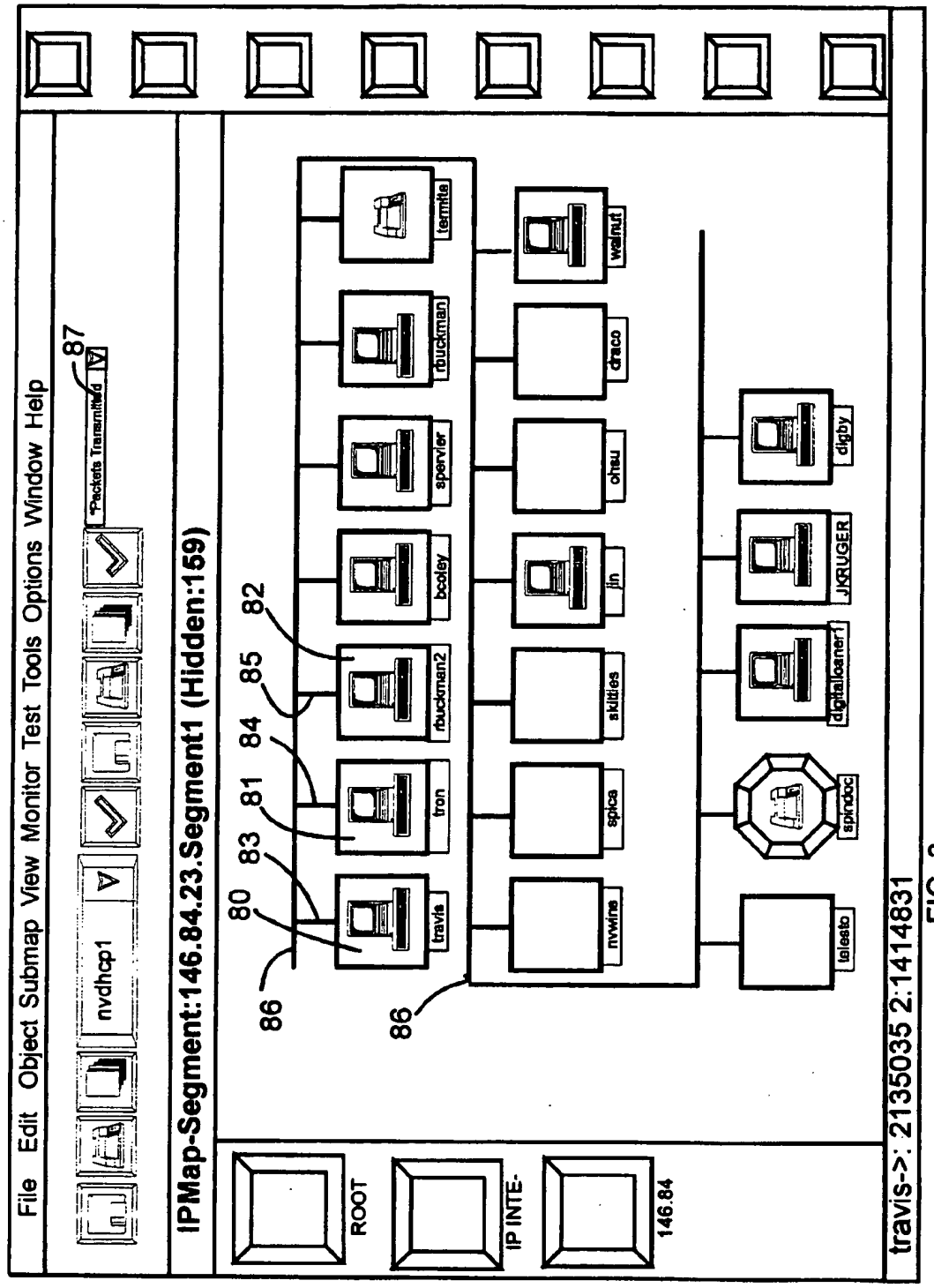
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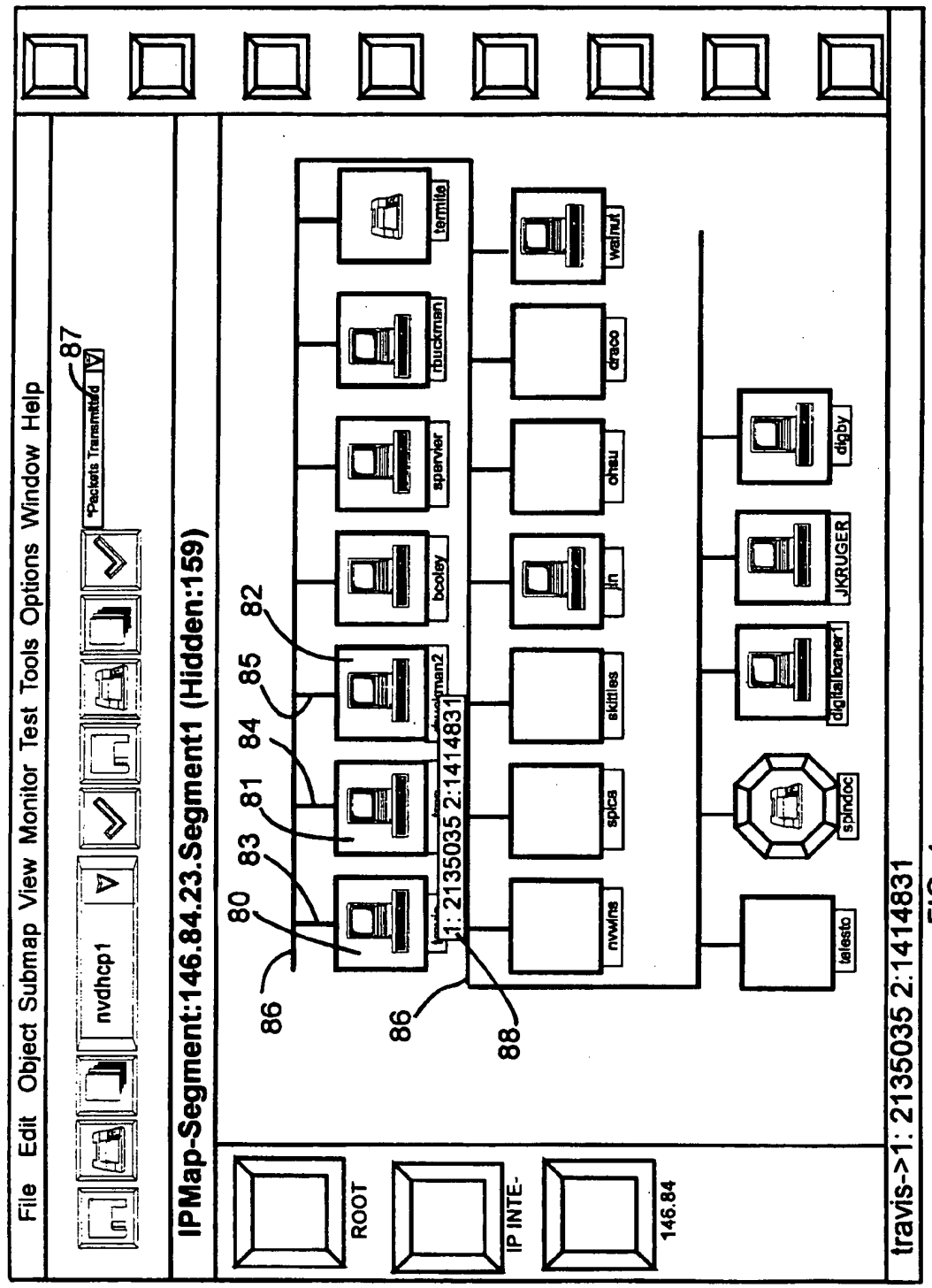
FIG. 3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ohau
draco
walnut
digby
JKRUGER
digitalloaner1
spindoc
telesto
80
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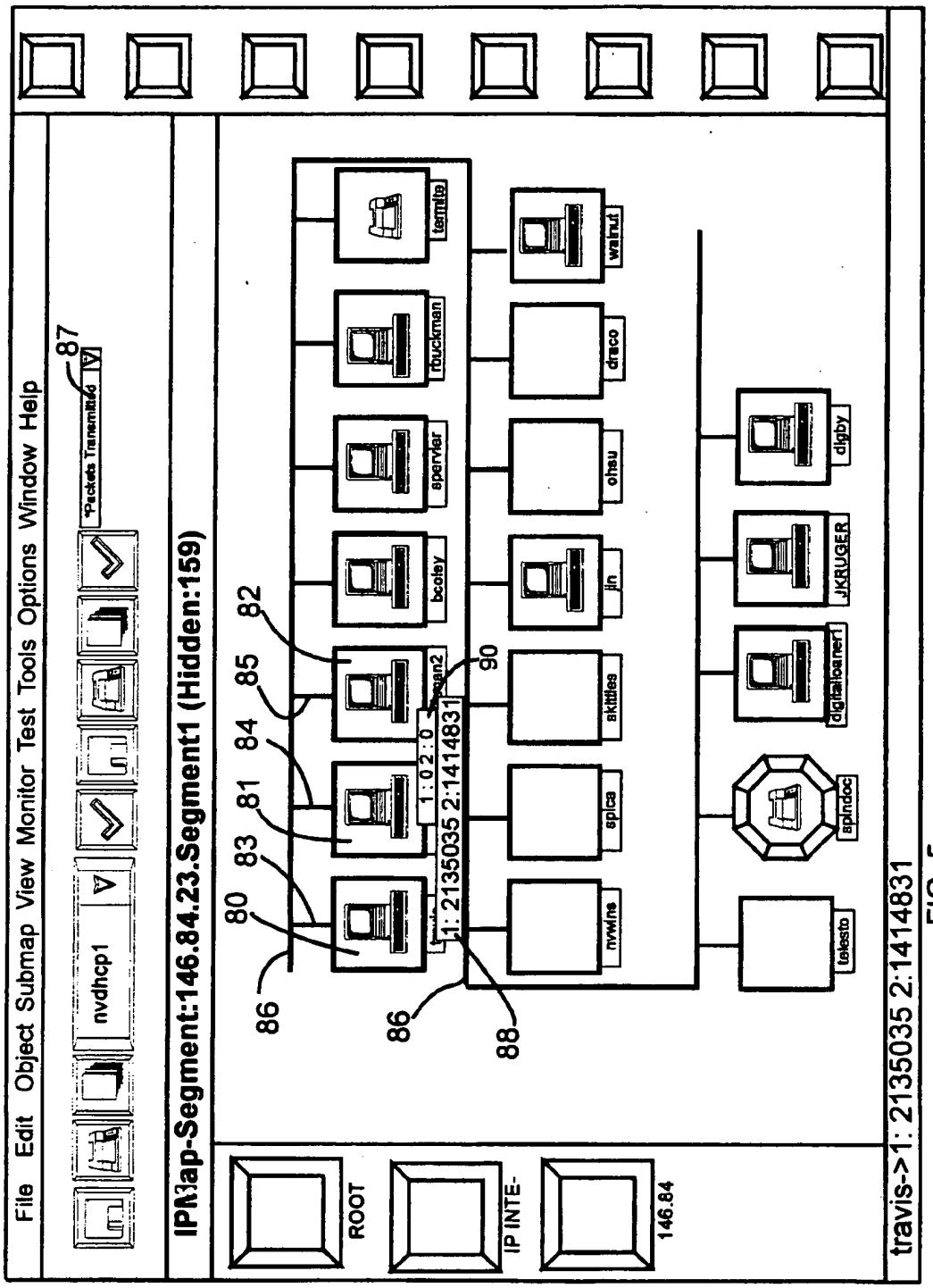
88
1: 2135035 2:1414831
ROOT
IP INTE-
146.84
travis->1: 2135035 2:1414831

FIG. 4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sperver
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draco
walnut
digby
JKRUGER
digitalloaner1
spindoc
takesto
nvwire
splca
skittles
1:0 2:0
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ROOT
IP INTE-
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travis->1: 2135035 2:1414831

FIG. 5

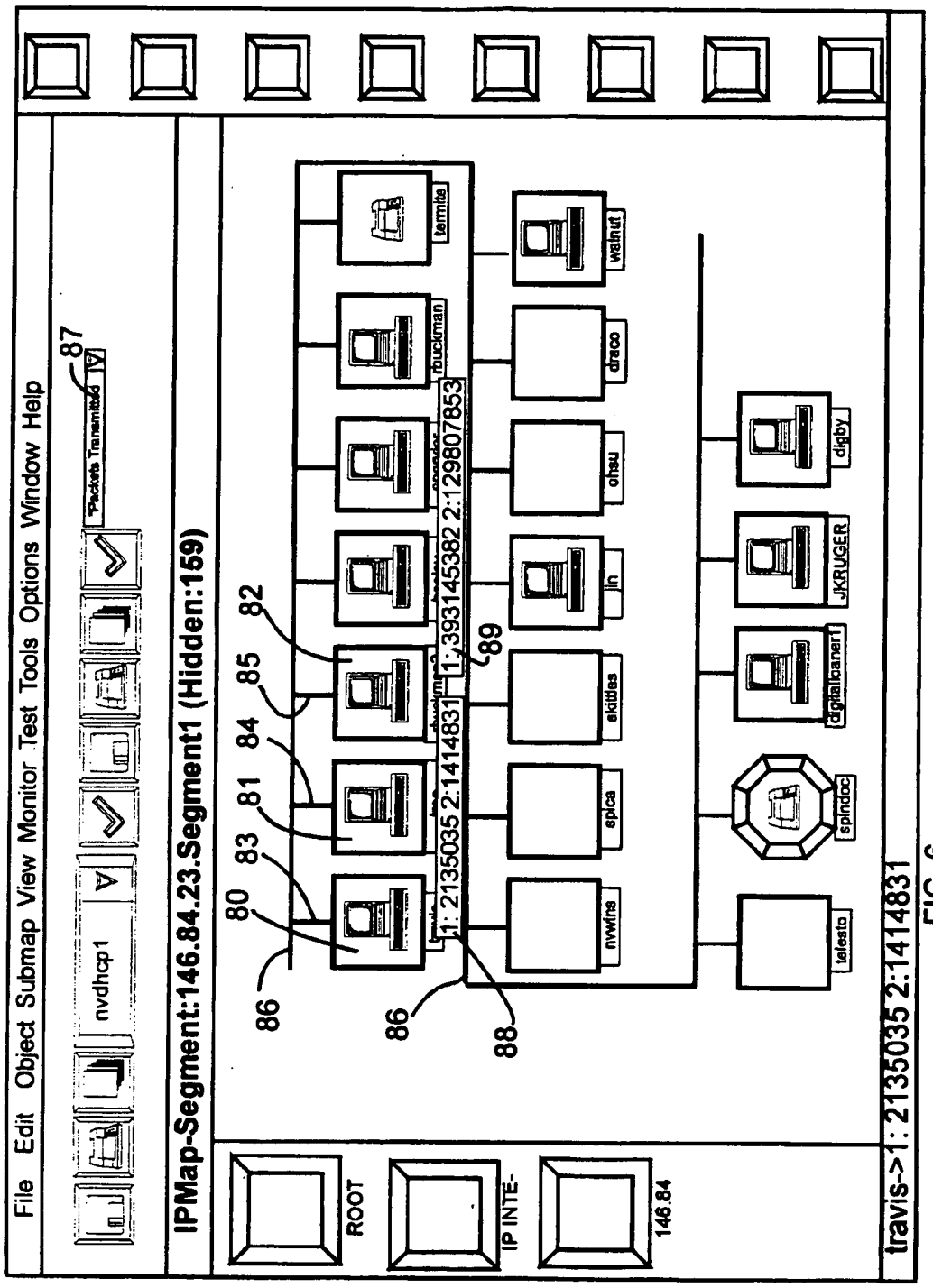
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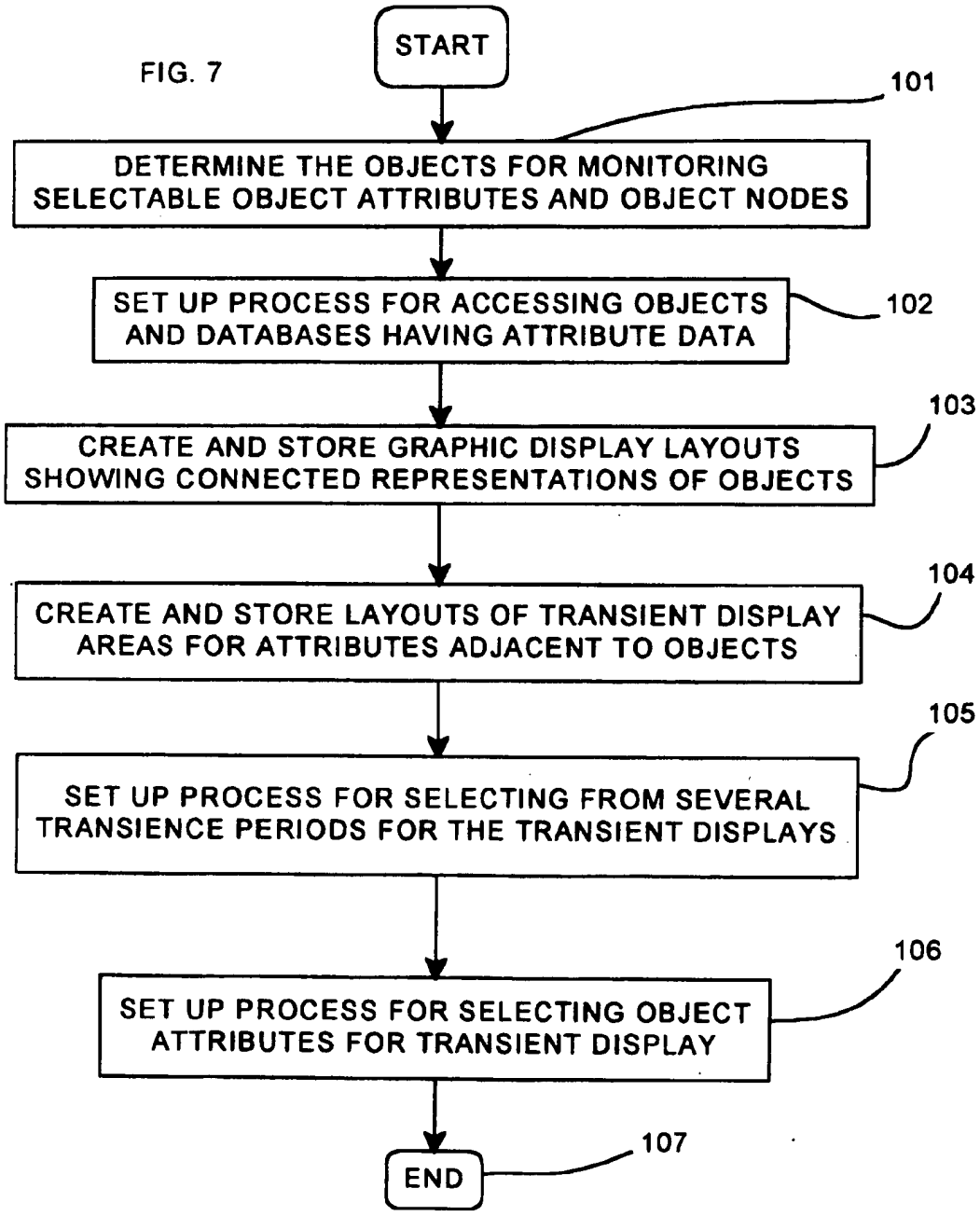
FIG. 6

FIG. 7


START
101
DETERMINE THE OBJECTS FOR MONITORING SELECTABLE OBJECT ATTRIBUTES AND OBJECT NODES
SET UP PROCESS FOR ACCESSING OBJECTS AND DATABASES HAVING ATTRIBUTE DATA
102
103
CREATE AND STORE GRAPHIC DISPLAY LAYOUTS SHOWING CONNECTED REPRESENTATIONS OF OBJECTS
104
CREATE AND STORE LAYOUTS OF TRANSIENT DISPLAY AREAS FOR ATTRIBUTES ADJACENT TO OBJECTS
105
SET UP PROCESS FOR SELECTING FROM SEVERAL TRANSIENCE PERIODS FOR THE TRANSIENT DISPLAYS
106
SET UP PROCESS FOR SELECTING OBJECT ATTRIBUTES FOR TRANSIENT DISPLAY
107
END

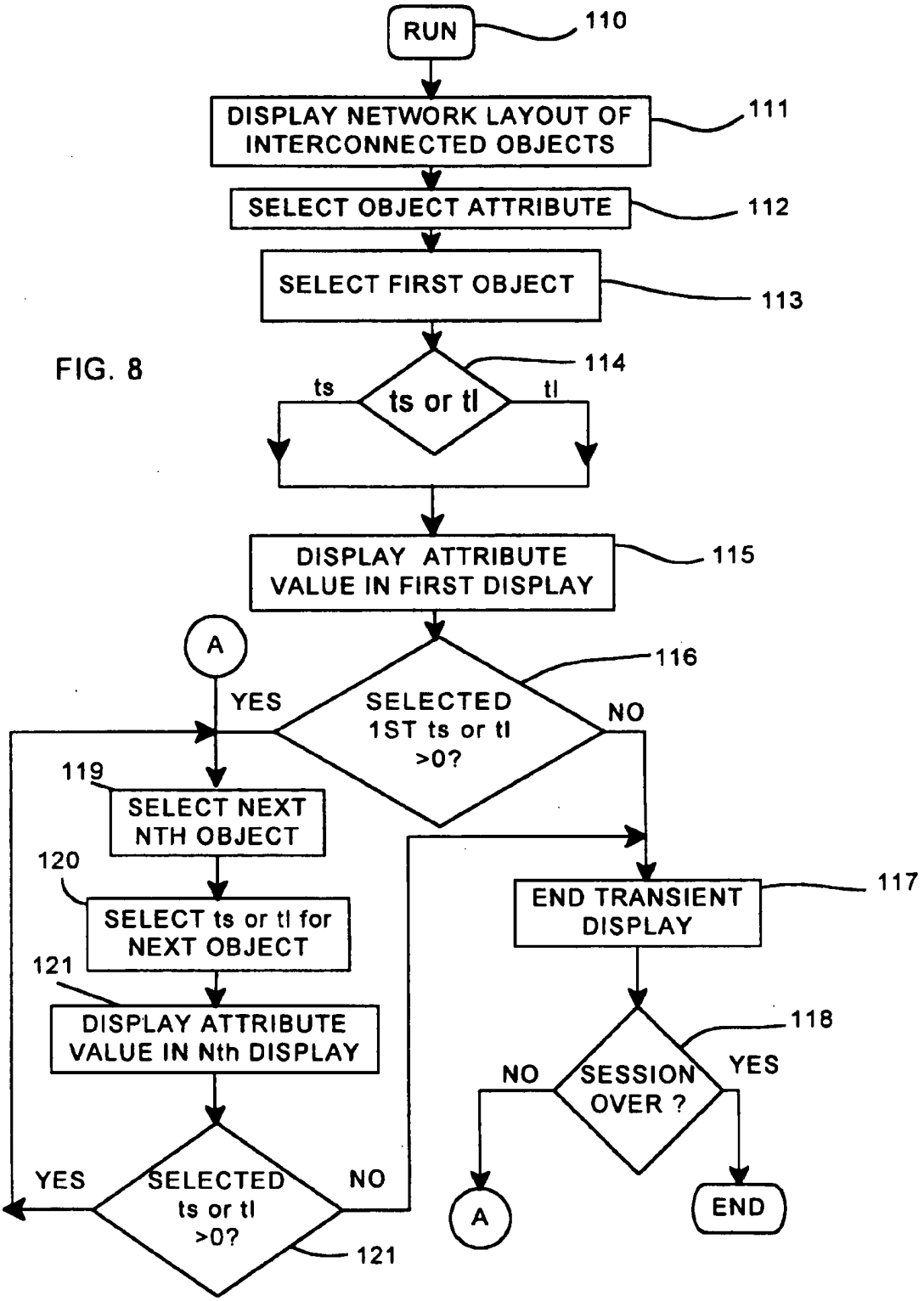

RUN
110
DISPLAY NETWORK LAYOUT OF INTERCONNECTED OBJECTS
111
SELECT OBJECT ATTRIBUTE
112
SELECT FIRST OBJECT
113
ts
ts or tl
tl
114
DISPLAY ATTRIBUTE VALUE IN FIRST DISPLAY
115
A
YES
SELECTED 1ST ts or tl >0?
NO
116
119
SELECT NEXT NTH OBJECT
120
SELECT ts or tl for NEXT OBJECT
121
DISPLAY ATTRIBUTE VALUE IN Nth DISPLAY
YES
SELECTED ts or tl >0?
NO
121
END TRANSIENT DISPLAY
117
118
NO
SESSION OVER ?
YES
A
END

FIG. 8

SYSTEM FOR DISPLAYING A COMPUTER MANAGED NETWORK LAYOUT WITH VARYING TRANSIENCE DISPLAY OF USER SELECTED ATTRIBUTES OF A PLURALITY OF DISPLAYED NETWORK OBJECTS

CROSS-REFERENCE TO RELATED COPENDING PATENT APPLICATIONS

The following two patent applications which have the same inventorship as the present invention and are assigned to a common assignee cover subject matter related to the subject matter of the present invention: A SYSTEM FOR DISPLAYING A COMPUTER MANAGED NETWORK LAYOUT WITH TRANSIENT DISPLAY OF USER SELECTED ATTRIBUTES OF DISPLAYED NETWORK OBJECTS, R. R. Scaer et al., (Attorney No. AT9-97-525) and A SYSTEM FOR DISPLAYING A COMPUTER MANAGED NETWORK LAYOUT WITH A FIRST TRANSIENT DISPLAY OF A USER SELECTED PRIMARY ATTRIBUTE OF AN OBJECT AND A SUPPLEMENTARY TRANSIENT DISPLAY OF SECONDARY ATTRIBUTES, R. R. Scaer et al., (Attorney No. AT9-97-524).

TECHNICAL FIELD

The present invention relates to computer managed communication networks and particularly to computer controlled user interactive display terminals for graphically displaying portions of such networks including linked nodes and associated network objects.

BACKGROUND OF THE INVENTION

The 1990's decade has been marked by a societal technological revolution driven by the convergence of the data processing industry, the communications industry and the consumer electronics industry. This advance has been even further accelerated by the extensive consumer and business involvement in the internet over the past two years. It seems as if virtually all aspects of human endeavor in the industrialized world will potentially involve human-computer interfaces, and especially such interfaces to communication networks such as the internet. As a result of these profound changes, there is a need to make computer directed activities accessible to a substantial portion of the world's population which, up to a year or two ago, was computer-illiterate, or at best computer indifferent. In order for the vast computer supported market places to continue and be commercially productive, it will be necessary for a large segment of computer indifferent consumers, workers and business people to be involved in computer interfaces. In addition because of the vast amount of information potentially available through networks such as the internet, there has been an increasing demand on the part of relatively sophisticated users for implementations which make display terminal access to the internet less cluttered and confusing and of course easier to use.

The present invention is directed to the problems of providing less cluttered and easier graphical display access to communication network nodes, objects associated with such nodes as well as the attributes of such objects. In order to solve such problems, the above mentioned SYSTEM FOR DISPLAYING A COMPUTER MANAGED NETWORK LAYOUT WITH TRANSIENT DISPLAY OF USER SELECTED ATTRIBUTES OF DISPLAYED NETWORK OBJECTS, R. R. Scaer et al., application makes use of transient displays in which user selected attributes of such

nodes and objects may be displayed. The present invention relates to circumstances where an attribute common to a plurality of displayed objects needs to be displayed in a plurality of common transient displays respectively associated with said plurality of objects for comparison of attributes and similar purposes. The present invention does this while keeping display screen clutter to a minimum.

SUMMARY OF THE INVENTION

The present invention relates to a computer managed communication network with user interactive access via a plurality of display terminals and including a plurality of network objects, each respectfully associated with one of a plurality of linked network nodes. The network includes means such as databases for storing data representing attributes of network objects. Means are provided for graphically displaying on at least one of said display terminals, at least a portion of said linked network nodes and associated objects. In addition, there is provided user interactive means for activating for each of a plurality of said displayed objects, a respective transient display of a selected attribute of said displayed object proximate to said object during a period of common transience, i.e. the time periods of such transient displays overlap each other thereby permitting a comparison of attribute values for said objects. User interactive means are provided for selecting the attribute, the value of which is to be displayed in the display of common transience.

In accordance with an important aspect of this invention, the period of transience for each of said transient displays may be user interactively varied so that attribute values of associated objects may be compared without strict regard to the order in which the transient displays were activated.

It should be noted that the stored data representing the object attributes is not necessarily stored static data. The data storage means for providing the selected attributes may be dynamic, i.e. the selected data attributes may calculated when selected or the attribute values may be dynamically combined from several databases.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of a data processing system including a central processing unit which is capable of implementing the transient display of the present invention;

FIG. **2** is a generalized diagrammatic view of an internet portion upon which the present invention may implemented;

FIG. **3** is a diagrammatic view of a display screen on which a network portion is graphically represented;

FIG. **4** is the display screen view of FIG. **3** with the value of a selected attribute of a first designated object transiently displayed;

FIG. **5** is the display screen of FIG. **4** after a second object has been selected and the value of the selected attribute of the second object is also transiently displayed;

FIG. **6** is the display screen of FIG. **5** after a third object has been selected and the value of the selected attribute of the third object is transiently displayed together the continued longer term transience of the first object display while the shorter transience display associated with the second object has disappeared;

FIG. **7** is a flowchart showing the development of a transient display process of the present invention; and

FIG. **8** is a flowchart showing the running of the transient display process described with respect to FIG. **7**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Before going into the details of specific embodiments, it will be helpful to understand from a more general perspec-

tive the various elements and method which may be used to implement the present invention. Since the present invention is directed to transient display expedients to improve the user-friendliness of graphical display interfaces to network object attributes, we will not go into great detail in describing the networks to which the present invention is applicable. U.S. Pat. Nos. 5,295,244, Dev et al. and 5,353,399, Kuwamoto et al. adequately detail conventional networks to which the present invention would be applicable including appropriate network management and display terminal access to such networks. Reference has also been made to the applicability of the present invention to a global network such as the internet. For details on internet nodes, objects and links, reference is made to the text, *Mastering the Internet,* G. H. Cady et al., published by Sybex Inc., Alameda, Calif., 1996.

Any data communication system which interconnects or links computer controlled systems or network objects at various sites or network nodes defines a communications network. A network may be as simple as two linked computers or it may be any combination of LANS (Local Area Networks) or WANS (Wide Area Networks). Of course, the internet is a global network of a heterogeneous mix of computer technologies and operating systems. At each level in a network hierarchy, the unit may considered as a network object. For example, since the internet connects networks of computers, a particular corporate network could be an internet object. Then, the particular LAN of each department in the corporate network would be an object. At high levels, regional networks representative of cities could be objects. Likewise, computer controlled objects could be linked together by function to form networks which in turn could be linked into the internet backbone as network objects characterized by functions as accounts receivable/payable or video-on-demand distribution. Higher level objects are linked to the lower level objects in the hierarchy through a variety of network server computers. For example, a video-on-demand distribution network could comprise several video server repository sites each having its unique collection of stored films; each of the sites would be network objects and the video distribution network itself would be an object on the internet. Of course at each level in the hierarchy, each object is associated with its own node.

In the subsequent, more specific descriptions of the preferred embodiment, the attributes and the storage of attributes will be discussed. It will be understood that the data representing particular object attributes or the data from which such particular attributes may be calculated dynamically may be stored in association with the object itself, a computer server managing the object or in a broad database associated with the overall network management.

In addition, for convenience in description of the operation of the various transient display implementations of the present invention, some simple object attributes may be used. It will be understood, that the implementations should be equally applicable in the reading of more complex attributes.

Referring to FIG. **1**, a typical data processing system is shown which may function as the computer controlled display terminal used in implementing the transient display functions in the present invention. A central processing unit (CPU), such as one of the PowerPC microprocessors available from International Business Machines Corporation (PowerPC is a trademark of International Business Machines Corporation) is provided and interconnected to various other components by system bus **12**. An operating system **41** runs on CPU **10** and provides control and is used to coordinate the function of the various components of FIG. **1**. Operating system **41** may be one of the commercially available operating systems such as DOS, or the OS/2 operating system available from International Business Machines Corporation (OS/2 is a trademark of International Business Machines Corporation). A programming system application **40** to be subsequently described in detail runs in conjunction with operating system **41** and provides output calls to the operating system **41** which implement the various functions to be performed by the application **40**.

A read only memory (ROM) **16** is connected to CPU **10**, via bus **12** and includes the basic input/output system (BIOS) that controls the basic computer functions. Random access memory (RAM) **14**, I/O adapter **18** and communications adapter **34** are also interconnected to system bus **12**. It should be noted that software components including the operating system **41** and the application **40** are loaded into RAM **14** which is the computer system's main memory. I/O adapter **18** may be a small computer system interface (SCSI) adapter that communicates with the disk storage device **20**, i.e. a hard drive. Communications adapter **34** interconnects bus **12** with an outside network enabling the data processing system to communicate with other such systems over a local area network (LAN), wide area network (WAN) which includes of course the internet. I/O devices are also connected to system bus **12** via user interface adapter **22** and display adapter **36**. Keyboard **24**, trackball **32**, mouse **26** and speaker **28** are all interconnected to bus **12** through user interface adapter **22**. It is through such input devices that the user interactive functions involved in the transient displays of the present invention may be implemented. Display adapter **36** includes a frame buffer **39** which is a storage device that holds a representation of each pixel on the display screen **38**. Images may be stored in frame buffer **39** for display on monitor **38** through various components such as a digital to analog converter (not shown) and the like. By using the aforementioned I/O devices, a user is capable of inputting information to the system through the keyboard **24**, trackball **32** or mouse **26** and receiving output information from the system via speaker **28** and display **38**. In the preferred embodiment, which will be subsequently described, the mouse will be the input means through which the used will interface with the system. the display terminal of FIG. **1** communicates with the network such as the internet through communications adapter **34**.

A generalized diagram of a portion of an internet to which the computer controlled display terminal **51** used for the transient display of the present invention is shown in FIG. **2**. Terminal **51** is the computer system shown in FIG. **1** and connection **52** (FIG. **2**) is the network connection shown in FIG. **1**. Some typical major objects connected to the net are user network **58** connected through server **59** at node **53**. In such a server network, the individual users' workstations **61** are connected through telephone modems **62** and **63** to the server **59**. Of course at the next level, each of the user workstations **61** may be considered as network objects. Among the other illustrative network objects are ethernet **64** at node **60** and a LAN at node **54** consisting of server **65** and workstations **66**. At node **55**, the connected object is a corporate WAN consisting of network server **67** and subnetworks **68**. In addition, functional networks such as financial services network **69** and video/film distribution network **70** may be considered as objects, respectively connected at nodes **56** and **57**. It should be noted that a variety of databases, **71** through **79** are shown respectively associated with network objects at various levels. These databases represent the various locations and repositories at which

attributes and attribute values which may be transiently displayed in accordance with the present invention are stored. Thus, when the obtaining or fetching of attributes values are subsequently described, it should be understood that they may be obtained from such databases or combination of databases throughout the network using any conventional network expedient for obtaining data.

There will now be described a simple illustration of the present invention with respect to the display screens of FIGS. **3** through **6**. When the screen images are described, it will be understood that these may be rendered by storing an icon creation program such as those in Windows 95 or OS-2 operating systems in the RAM **14** of the system of FIG. **1**. The operating system is diagrammatically shown in FIG. **1** as operating system **41**.

An embodiment of the present invention will be described commencing with the display screen shown in FIG. **3**. This initial display screen is presented to the viewer on display monitor **38** of FIG. **1**. In accordance with conventional techniques, the user may control the screen interactively through a conventional I/O device such as mouse **26** of FIG. **1** which operates through user interface **22** to call upon programs in RAM **14** cooperating with the operating system **41** to create the images in frame buffer **39** of display adapter **36** to control the display on monitor **38**.

The initial display screen of FIG. **3** shows a graphic representation of a portion of a network in which network objects are represented as icons such as objects **80**, **81**, and **82** respectively connected at node representations **83**, **84** and **85** to network bus representation **86**. In the display screen shown, an attribute is selected by clicking on attribute window **87** by a user interactive I/O device such as mouse **26**, FIG. **1**. This scrolls through a menu of attributes from which the user selects the attribute which in the present case is "Packets Transmitted". Now, the user must select one of the objects so that the programming process may fetch an attribute value for that object. With reference to the same display screen shown in FIG. **4**, the user has made a selection of object **80**. By moving his cursor in a gesture (not shown) under control of mouse **26**, FIG. **1** to the object **80**. In the present control system, this selection gesture merely involved hovering (maintaining the cursor without clicking the mouse in the vicinity of object icon **80** for a brief time period set by the program). As a result, the packets transmitted attribute value, i.e. numerical data indicative of transmitted packets appears in the transient display area **88** for object **80**. As will be hereinafter described with respect to the flowcharts of FIGS. **7** and **8**, this value may obtained from any appropriate database **71–79** in FIG. **2** or it may be dynamically calculated from data in one or more of these databases. In addition, the attribute values may be retrieved via a network information protocol such as SNMP (Simple Network Management Protocol), DMI (Desktop Management Interface) or WEBM (Web Management).

The key aspect of the present invention involves creating displays of varying transience. The system may be set up to select and set up the time of transience based upon the time that the user hovers the cursor above the selected object. For example, lets us assume two selectable periods of varying transience for the displays: 1) a shorter transience time of 20 seconds is set up by hovering the cursor for 0.3 seconds and 2) a longer transience of 1 minute is set up by hovering the cursor above the selected object for 3 seconds. The system program uses conventional means for setting the time that the transient display **88** will be on. In the present example, the user has hovered the cursor for the longer period of 3 seconds and consequently the transient display will be on for the longer period of 1 minute. Meanwhile as shown in FIG. **5**, the user has selected another object **81** and has hovered the cursor above object **81** for the shorter 0.3 second time thereby resulting in the transient display **90** containing the "packets transmitted" value of object being shown for only 20 seconds. Now with reference to FIG. **6**, a subsequent object has been selected, object **82** and a transient display **89** has been set up for it for the longer time period as previously described. It should be noted that while the longer transient display **88** for object **80** is still present, the shorter transient display for object **81** has disappeared.

Now with reference to FIGS. **7** and **8**, we will describe a process implemented by the present invention in conjunction with the flowcharts of these figures. FIG. **7** is a flowchart showing the development of a transient display process of the present invention. FIG. **8** is a flowchart showing the running of the transient display process described with respect to FIG. **7**.

With reference to FIG. **7**, first, process step **101**, in developing the program, a determination should be made as to which objects are to be monitored for attributes. It could range from a major internet portion objects, FIG. **2**, to a local network having a handful of objects. Next, step **102**, a program process for accessing the attribute data for the objects is created and stored. For simplicity in illustration, the attribute data could be considered as stored in the databases **71** through **79**, FIG. **2**, associated with the various objects. Accessing of the databases and the fetching of attribute data could involve any conventional network routines for data acquisition. The display screen layouts of icons representative of objects together with appropriate interconnections as in the illustrative layouts of FIGS. **3–6** using conventional user interfaces provided by operating systems such as "Windows 95", (a TM of Microsoft Corp.) or "X-Windows", step **103** are created and stored. Then, step **104**, using the same layout design program, layouts for the transient displays such as those in FIGS. **4–6** are developed. Next, step **105**, a process is set for selecting from several periods of transience for each transient display, which transience is to be set for showing the attribute value of a selected object. Making the transience period determined by the period of hovering a cursor as described above is an effective procedure. However, the period of transience could be preset for each of the transient fields.

Also, a procedure is set up through which the user will be able to interactively select through interfaces such as those of FIGS. **3–6**, objects and their attributes in a dynamic manner, step **106**. This ends **107** the program set up. The running of the process will now be described with respect to FIG. **8**. In following some typical routines, the step in FIG. **8** will given together with a reference to the display screen of FIGS. **3–6** which best illustrates the step. The program is run, step **110**, and a network layout is displayed, step **111**, as in FIG. **3**. Next, step **112**, an object attribute is selected as "Packets Transmitted" in the FIGS. **3** and **4** displays. Then, step **113**, an object is selected, object **80**, FIG. **4** layout which sets off a transient display of the value of the selected attribute for the selected object, i.e., transient display **88**. At this point, decision step **114**, a selection of the short or long transience period is made and an appropriate timer for the selected short: "ts" or long: "tl" period is made, after which the attribute value for that object **80** (FIG. **4**) is shown in a transient display such as display **88**. Then as in decision step **116**, a determination is made as to whether time remains. If Yes, the procedure goes to step **119**, another object is selected, a period of transience selected, step **120**, and the value of the attribute displayed in a subsequent display, step

121. This is transient display **90** for object **81** in FIG. **5**. Since as set forth, earlier in the flow description, transient display **88** has not timed out as yet, both transient displays **88** and **90** are both present. At this point, a determination is made, decision step **122** as to whether the second transient display i.e., display **90**, FIG. **5** has timed out. As we previously described transient display **90** has timed out because it was selected for the short period of transience. Therefore, the flow goes to step **117**, FIG. **8** and display **90** is ended as shown in FIG. **6**. At this point, decision step **118**, a determination is made as to whether the session is over. If it is, the session is ended. However, in the present example, assume that the session is not over. It proceeds back to step **119** via branch "A", and the next object is selected. In the present example, this is object **82**, FIG. **6**. By the previously described hovering technique, a transience period is selected, step **120** and the attribute value for object **82** is displayed in the nth transient display i.e., display **89**. Thus transient displays **88** and **89** remain commonly displayed while transient display **90** which had been displayed intermediately for a short transience period has disappeared.

Although certain preferred embodiments have been shown and described, it will be understood that many changes and modifications may be made therein without departing from the scope and intent of the appended claims.

We claim:

1. In a computer managed communication network with user interactive access via a plurality of display terminals and including a plurality of network objects, each respectively associated with one of a plurality of linked network nodes,

means for storing data representing attributes of said network objects,

means for graphically displaying on at least one of said display terminals, at least a portion of said linked network nodes and associated objects,

user interactive means for activating for each of a plurality of said displayed objects, a respective transient display of a selected attribute of said displayed object proximate to said object during a period of common transience, and

user interactive means for selecting the attributes to be transiently displayed.

2. The computer managed communication network of claim **1**, wherein the selected attribute is common to said plurality of objects.

3. The computer managed communication network of claim **1**, further including user interactive means for varying the period of transience of each of said transient displays.

4. The computer managed communication network of claim **2**, further including user interactive means for varying the period of transience of each of said transient displays.

5. The computer managed communication network of claim **4**, wherein said user interactive means for activating said transient displays include said means for varying the period of transience.

6. The computer managed communication network of claim **5**, wherein said means for activating said transient displays comprise means for hovering a cursor proximate to a selected object for a predetermined time period.

7. A method for determining the status of attributes of a plurality of network objects each respectively associated with one of a plurality of linked network nodes in a computer managed communication network with user interactive access via a plurality of display terminals comprising

storing data representing attributes of said network objects,

graphically displaying on at least one of said display terminals, at least a portion of said linked network nodes and associated objects, and

activating for each of a plurality of said displayed objects a respective transient display of a selected attribute of said displayed object proximate to said object during a period of common transience.

8. A method according to claim **7**, wherein the selected attribute is common to said plurality of objects.

9. A method according to claim **7**, further including the step of user interactively varying the period of transience of each of said transient displays.

10. A method according to claim **8**, further including the step of user interactively varying the period of transience of each of said transient displays.

11. A method according to claim **10** wherein said transient display is activated hovering a cursor proximate to a selected object for a predetermined time period.

12. A computer program for a computer managed communication network with user interactive access via a plurality of display terminals and including a plurality of network objects, each respectively associated with one of a plurality of linked network nodes, said program having data structures included on a computer readable medium comprising:

means for storing data representing attributes of said network objects,

means for graphically displaying on at least one of said display terminals, at least a portion of said linked network nodes and associated objects,

user interactive means for activating for each of a plurality of said displayed objects, a respective transient display of a selected attribute of said displayed object proximate to said object during a period of common transience, and

user interactive means for selecting the attributes to be transiently displayed.

13. The computer program according to claim **12**, wherein the selected attribute is common to said plurality of objects.

14. The computer program according to claim **12**, further including user interactive means for varying the period of transience of each of said transient displays.

15. The computer program according to claim **13**, further including user interactive means for varying the period of transience of each of said transient displays.

16. The computer program according to claim **15**, wherein said user interactive means for activating said transient displays include said means for varying the period of transience.

17. The computer program according to claim **16**, wherein said means for activating said transient displays comprise means for hovering a cursor proximate to a selected object for a predetermined time period.

18. A computer implemented method for displaying user interactive objects comprising:

displaying a plurality of selectable user interactive objects;

storing data representing attributes of the objects; and

upon selection of one of the objects, displaying a plurality of transient displays of an attribute of the selected object, wherein each of the transient displays has a different period of transience.

19. A user interactive computer controlled display system comprising:

means for displaying a plurality of selectable user interactive objects,

means for storing data representing attributes of said objects,

user interactive means for activating for each of a plurality of said displayed objects, a transient display of a selected attribute of said displayed object proximate to said object during a period of variable transience,

means for varying the transience of said transient display, and

user interactive means for selecting the attribute to be transiently displayed.

20. A computer implemented method for displaying user interactive objects comprising:

displaying a plurality of selectable user interactive objects,

storing data representing attributes of said objects,

activating for at least one of said displayed objects, a transient display of a selected attribute of said displayed object proximate to said object during a period of variable transience,

varying the transience of said transient display, and

selecting the attribute to be transiently displayed.

21. A computer program for a computer controlled interactive display system having data structures included on a computer readable medium comprising:

means for displaying a plurality of selectable user interactive objects,

means for storing data representing attributes of said objects,

user interactive means for activating for each of a plurality of said displayed objects, a transient display of a selected attribute of said displayed object proximate to said object during a period of variable transience,

means for varying the transience of said transient display, and

user interactive means for selecting the attribute to be transiently displayed.

22. In a computer managed communication network with user interactive access via a plurality of display terminals and including a plurality of network objects, each respectively associated with one of a plurality of linked network nodes,

means for storing data representing attributes of said network objects;

means for graphically displaying on at least one of said display terminals, at least a portion of said linked network nodes and associated objects;

user interactive means for activating for each of a plurality of said displayed objects, a respective transient display of a selected attribute common to said plurality of objects proximate to said object during a variable period of common transience having:

user interactive means for varying the period of transience of each of said transient displays including:

means for hovering a cursor proximate to a selected object, and

means for setting a plurality of predetermined time periods for said hovering of said cursor, each of said predetermined periods of hovering resulting in a different period of transience of the display for the object of said hovered cursor; and

user interactive means for selecting the attributes to be transiently displayed.

23. A method for determining the status of attributes of a plurality of network objects each respectively associated with one of a plurality of linked network nodes in a computer managed communication network with user interactive access via a plurality of display terminals comprising:

storing data representing attributes of said network objects;

graphically displaying on at least one of said display terminals, at least a portion of said linked network nodes and associated objects;

activating for each of a plurality of said displayed objects, a respective transient display of a selected attribute common to said plurality of objects proximate to said object during a variable period of common transience by steps including:

varying the period of transience of each of said transient displays by hovering a cursor proximate to a selected object for a predetermined time period, and

setting a plurality of said predetermined time periods for hovering of said cursor, each of said predetermined periods of hovering resulting in a different period of transience of the display for the object of said hovered cursor, and

selecting the attributes to be transiently displayed.

24. A computer program for a computer managed communication network with user interactive access via a plurality of display terminals and including a plurality of network objects, each respectively associated with one of a plurality of linked network nodes, said program having data structures included on a computer readable medium comprising:

means for storing data representing attributes of said network objects;

means for graphically displaying on at least one of said display terminals, at least a portion of said linked network nodes and associated objects;

user interactive means for activating for each of a plurality of said displayed objects, a respective transient display of a selected attribute common to said plurality of objects proximate to said object during a variable period of common transience having:

user interactive means for varying the period of transience of each of said transient displays including:

means for hovering a cursor proximate to a selected object, and

means for setting a plurality of predetermined time periods for hovering of said cursor, each of said predetermined periods of hovering resulting in a different period of transience of the display for the object of said hovered cursor, and

user interactive means for selecting the attributes to be transiently displayed.

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